Worksheet 1B Processor components

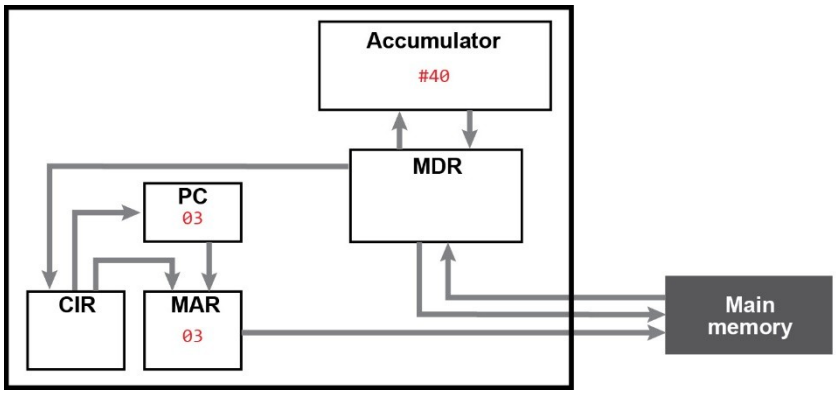
1. A computer is designed to be programmed using simplified assembly language. The instruction in memory location `03` is `ADD 06` and is used to add the value stored in memory location `06` to the value stored in the Accumulator.

   Numerical values are being used and are labelled with a # mark. The value currently in the accumulator is `#40`. There is a value of `#15` in memory location `06`.

   Complete the diagrams of the states of the processor components at various stages in the Fetch-Execute cycles showing how the result of this instruction is determined and stored in the accumulator.

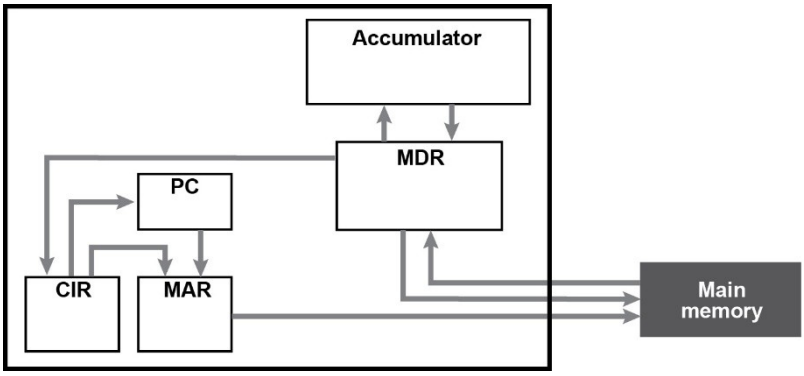
   Also add to the diagram a description of what is happening at each part of the three main stages, (the first has been completed as an example):

Fetch – Stage 1



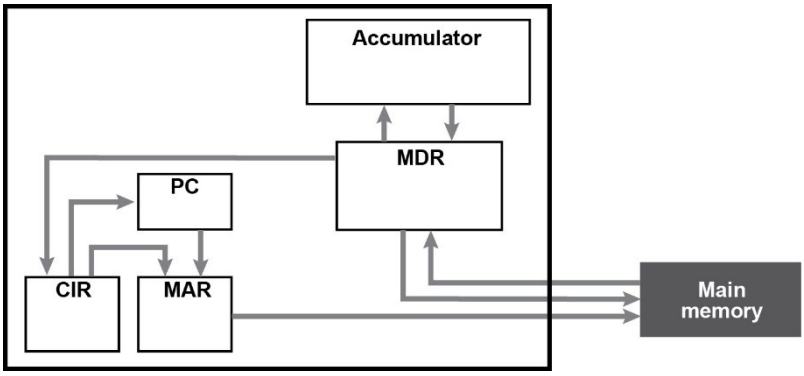
Description of diagram:
The Program Counter contains the memory address of the next instruction to be processed, (03). This is copied into the Memory Address Register so that the instruction can be read. The memory location is requested to be read by the process.

Fetch – Stage 2



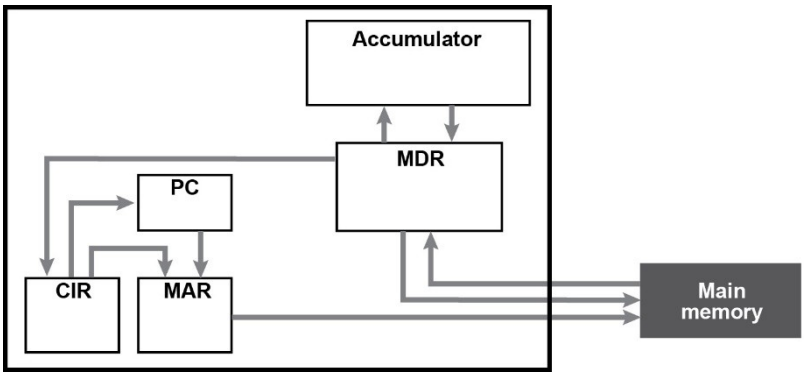
Description of diagram:

Fetch – Stage 3



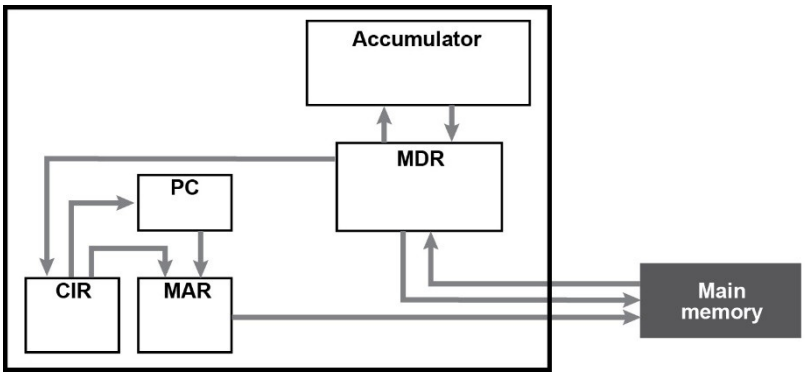
Description of diagram:

Decode – Stage 4



Description of diagram:

Execute – Stage 5



Description of diagram:

2. The next instruction at address `04` is `STA 07` where the result of the previous instruction is written to memory. Describe broadly the process the Fetch-Execute cycle will follow to achieve this.